CLIMATE AND LAND ADMINISTRATION

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KEY MESSSAGES

Ethiopia faces recurring droughts and varying climate patterns including erratic rainfall patterns, higher temperatures, and increased frequency of extreme weather events that contribute to water scarcity, impacting agricultural productivity and food security. Climate change is posing significant challenges to urban and rural areas. More importantly, the poor is more impacted by climate change in Ethiopia. Climate changes have direct repercussions on water availability, rainfall patterns, soil and air quality, temperature variability, grazing lands and forestation, and overall biodiversity and public and livestock health.

Farmers and urban residents have a good understanding of the causes, indicators, and determinants of climate change. Many linked observed environmental changes, such as increased droughts and erratic rainfall, to climate change, although the understanding of the underlying causes varied widely.

Incorporating peoples' perceptions into the design of adaptation and mitigation strategies can improve the relevance and effectiveness of measures. The combination of multiple adaptation and mitigation strategies can provide greater benefits. They include climate-resilient agriculture and agroforestry systems, crop diversification, irrigation expansion and fertilizer use intensification, and successful participatory and community-based natural resource management approaches. The introduction of climate change mitigation and adaptation strategies is influenced by a complex interplay of knowledge, economic factors, social dynamics, policy support, environmental conditions, and technological availability.

Despite advancements in policy formulation and implementation, there are challenges in achieving intended outcomes. These include limited financial resources, inadequate infrastructure, weak institutional capacity and coordination, the need for enhanced stakeholder engagement at local levels, and inadequate monitoring and evaluation of the adaptation benefits.

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Consequently, climate change impacts continue to pose significant risks. Land-use policies can play a crucial role in moderating the impacts of climate anomalies in Ethiopia. Effective implementation and enforcement of land-use policies are necessary to address the complex challenges of climate change. Policymakers and land-use planners should design and implement climate-smart and context-specific land-use policies. Additional recommendations to tackle the challenges of climate change are:

Foster greater collaboration between government agencies, local communities, and private sectors to ensure inclusive participation in policy implementation.

Coordinated efforts that encompass mitigation, adaptation, and loss and damage at local, national, and global levels by strengthening financial mechanisms to secure funding.

Targeted policies, increase investment in climate-resilient infrastructure and technologies, and extension services.

Holistic approaches that balance ecological, economic, and social needs.

Enhance capacity building and education around climate change to empower local stakeholders.

Monitor and evaluate policies regularly to adapt to emerging challenges and improve policy responses.

BACKGROUND AND CONTEXT

Ethiopia has witnessed severe impacts of climate by increased frequency of extreme weather events. Ethiopia's climate change policy has evolved over time. It initially focused on conservationism, emphasizing resource preservation and environmental protection. Over time, this evolved into a more comprehensive green economy strategy aimed at sustainable development and economic growth such as the Climate Resilient Green Economy strategy and the Ethiopia National Adaptation Programme of Action.

Various sectoral policies, such as the National Energy Policy and the National Forest Policy, also incorporate climate change considerations. These frameworks emphasize resilience-building and the integration of climate adaptation into national development plans. Ethiopia has also ratified the United Nations Framework Convention on Climate Change (UNFCCC) and its Paris Agreement, which guides the country's climate change commitments.

The importance of international cooperation in addressing climate change impacts is well recognized. The cooperation is focusing on sustainable practices, technological innovation, and inclusive policy frameworks. It is making significant progress in enhancing agricultural resilience to climate change, ensuring food security, and contributing to global sustainability efforts.

Ethiopia's climate change policies and regulations are generally well-aligned with the international principles and provisions such as the emphasis on sustainable development, common but differentiated responsibilities, and the need for international cooperation. Climate change adaptation and mitigation strategies play important role to reduce impacts of climate change.

Mitigation refers to the efforts to reduce or prevent the emission of greenhouse gases (GHGs) into the atmosphere to limit climate change. Whereas adaptation refers to adjustments in systems, practices, and structures to minimize the adverse effects of climate change or to take advantage of new opportunities. However, the climate change mitigation and adaptation mechanisms have faced policy challenges and opportunities which include institutional fragmentation between climate change and development policy domains, lack of policy coherence, and resource constraints. There is also the need for more robust monitoring, reporting, and verification systems, as well as the effective implementation and enforcement of climate change regulations and international agreements. Addressing these barriers through integrating policy interventions, investments and development planning, and collaborative efforts into climate change can enhance the adaptive capacity of farmers and communities.

The issue of climate change seems broad but it is very much linked to land administration. Land administration mainly includes four components, namely, land tenure, land use and planning, value, and development. Accordingly, the issues dealt with in this brief in relation to climate change such as agricultural practices, forestry, land use changes, dams, hydrology, and investment are in one way or another related to these aspects. More explicitly, the use of land administration for climate change mitigation and adaptation is being increasingly recognized at global level. If there is no appropriate land administration system, there will be ecosystem degradation and disaster risks which results in climate change.

Methodology

Literature review was the main method of this study. The review was made systematically. The key words that can represent the study subject were identified. The databases that are globally recognized were searched. All studies made on Ethiopian land administration were downloaded and summary tables for all relevant study reports were organized. Assessment report was prepared and was used as the base for developing draft policy briefs. The draft policy briefs were further refined and finalized considering feedback and comments gathered from stakeholders and the client.

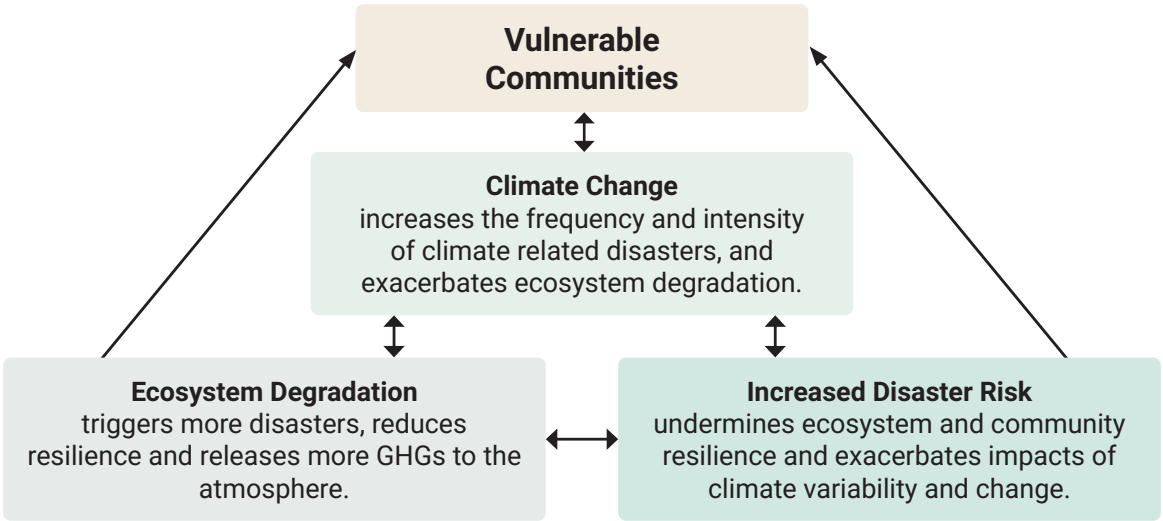

Figure 1. The interaction between climate change and land administration systems (Source: United Nations Environmental Programe, 2009)

Findings

Climate Mitigation and Adaptation Mechanisms

Climate smart agriculture practices can enhance resilience, productivity, and environmental sustainability. They include soil and water conservation, diversification of crops and livestock, climate-resilient crop varieties and livestock breeds, improved water management (e.g., irrigation, rainwater harvesting), early warning systems, and climate information services. Traditional agroforestry systems, tree diversity, and dryland forests support the livelihoods and climate resilience of smallholder farmers in Ethiopia. Rainfall significantly influences farming activities, making it a critical predictor of climate change effects. Increasing variability in rainfall patterns poses challenges for crop production, soil health, and overall agricultural sustainability.

Agriculture is a significant source of greenhouse gas emissions in Ethiopia, primarily due to enteric fermentation in livestock, soil management practices, and rice cultivation. Household adaptive capacity varies significantly across the Ethiopia. Factors influencing adoptive capacity include income levels, education, access to information, local environmental conditions, socio-economic factors, cultural practices, and social networks.

Households with diversified livelihoods and access to agricultural extension services demonstrated greater resilience. Local knowledge and practices in adaptation strategies as well as community support systems are also important. Individuals in regions severely affected by climatic events are more likely to migrate as a coping mechanism.
Barriers to climate change adaptation and disaster risk reduction include limited access to technology, lack of financial resources, insufficient knowledge about climate-resilient practices, and inadequate support from agricultural institutions.

Adaptation strategies in use include agroforestry, improved crop varieties, and water management techniques that show potential for reducing emissions and increasing resilience. The Green Revolution strategies (introduction of high-yielding varieties of crops, improved agricultural practices, and increased use of fertilizers and irrigation) have led to significant increases in crop yields and overall agricultural productivity.

The use of small-scale sand dams in Ethiopia can be a valuable and cost-effective solution to secure water supply, improve water access and quality, and enhance the resilience of communities to the impacts of drought and water scarcity. The indigenous knowledge and practices of pastoral hold immense potential for building resilience and adaptation in the production systems. Recognizing and integrating this knowledge into development policies and programs and appropriate technological and institutional innovations can contribute to more sustainable and equitable outcomes for these communities.

Acknowledging the complexities and challenges inherent in relationships between various stakeholders such as local communities, the state, and non-governmental organizations (NGOs) is essential for developing effective and equitable conservation strategies such as in national parks. Planting of different forest varieties such as Faidherbia albida has significant potential for carbon sequestration in agroforestry systems. The modeling of blue and green water resources in a river basin under changing climate conditions will provide critical insights for sustainable water management and agricultural planning.

Recognizing and leveraging the synergies between land restoration activities (such as reforestation, agroforestry, and sustainable land management practices) and climate change mitigation, helps

food security programmes to contribute to more sustainable and resilient agricultural systems, while also addressing the global challenges of food security and climate change.

Appropriate technologies play critical role in addressing the multifaceted challenges of transboundary water resource management in the Nile River Basin, particularly in the context of climate change. The adaptation practices are impacted by proper land use plan implementation. Understanding these effects is crucial for developing sustainable land-use practices that conserve biodiversity and enhance carbon sequestration.

Pollution is the main climatic challenge in urban areas. Taxers can be used to enforce the polluters pay principle. Potential environmental taxes in Ethiopia include pollution taxes, resource extraction taxes, product taxes, and vehicle taxes.

Building a cohesive strategy that understands and accommodates the aspirations and realities of local communities in the face of large-scale development projects is fundamental for achieving equitable and sustainable outcomes. Developing a comprehensive landslide inventory and susceptibility map helps to support disaster risk reduction efforts. Integrated rainwater harvest practices contribute to poverty reduction and climate change adaptation in Ethiopia.

Considering climate variability and information in investment decisions in key sectors such as agriculture, energy, and infrastructure can lead to significant economic benefits by enabling more informed and resilient investment choices, ultimately contributing to the country's sustainable development and adaptation to climate change. A place-based framework for assessing effective resettlement strategies and capacity in the context of climate change-induced displacement is essential for crafting informed and effective responses to the growing challenge of displacement.

Participatory and community-based natural resource management approaches which include community-based forest management, grazing land management, and integrated watershed management are crucial to enhance climate change adaptation and build resilience at the local level. Mass mobilization has the potential to enhance sustainable land management in Ethiopia which has hinged on active community participation, engaging local stakeholders in planning and implementation, and decision-making processes.

Challenges of Climate Change Adaptation and Mitigation Mechanism

Gender-based constraints, such as limited access to information, technology, and extension services, hinder women's ability to adopt adaptation strategies. Households with greater gender equality in decision-making and resource allocation are more likely to adopt a wider range of adaptation strategies. Women's involvement in decision-making and control over agricultural resources positively influences the household's adaptation capacity. Climate change poses significant challenges to the hydrology of the Blue Nile Basin and other watersheds, with wide-ranging implications for water resources, agriculture, and socio-economic stability. The solutions involve integrated water resource management, climate-resilient agricultural practices, investment in water infrastructure, and public awareness and capacity building.

While Ethiopia has established a legal framework for environmental protection, its enforcement and implementation are often weak.

Many corporations demonstrate a lack of compliance with environmental regulations due to inadequate monitoring and enforcement mechanisms. Additionally, the awareness of corporate environmental responsibility among businesses remains limited, and there is insufficient legal accountability for environmental violations.

While Ethiopia has established various laws and regulations regarding hazardous waste management, enforcement remains a significant challenge. There is a lack of awareness and training among stakeholders, which leads to improper disposal practices. Furthermore, the existing infrastructure for waste management is inadequate, resulting in environmental degradation and health risks for local communities.

Land Administration Systems for Climate Change Adaptation and Mitigation

Effective land management initiatives such as land certification and a well-designed cadastral and land registration system have a positive and significant effect on smallholders' investment in sustainable land management practices, such as soil and water conservation, agroforestry, and the adoption of improved crop varieties. These practices have positive impacts on agricultural productivity, climate change adaptation, and environmental conservation in pastoral, agro-pastoral, and agricultural communities. Urban and regional planning plays a critical role in fostering sustainable governance, particularly in rapidly growing cities like Addis Ababa. Successful mainstreaming of climate change adaptation into regional planning, urban planning and sustainable land use planning is essential for building resilience in Ethiopia.

Recommendations

Policymakers should consider strengthening land tenure security as it contributes to promote sustainable land management through climate change mitigation and adaptation, and, to agricultural productivity.

We need to ensure that regional planning frameworks and water, conservation, and land management align with national climate adaptation policies by creating legislative and policy coherence which enhances synergies and avoiding redundancy in efforts.

To enhance climate adaptation of pastoralist communities, we need an inclusive policy development, strengthening land rights, develop adaptive management strategies that allow for mobility and flexibility in pastoral practices, and encourage collaborative research that combines environmental science, economics, and social sciences to address the complexities of climate change and pastoralism.

For Ethiopia to advance its environmental goals, it is essential to strengthen the legal and institutional frameworks governing corporate environmental responsibility including effective enforcement mechanisms, greater corporate engagement, and enhanced public participation in environmental governance.

Improving the implementation and enforcement of climate change regulations and international agreements, through enhanced institutional capacity and stakeholder engagement, is crucial for achieving the desired mitigation and adaptation outcomes.

Ethiopia has made significant progress in integrating climate change adaptation and mitigation into its national development plans and strategies such as the Growth and Transformation Plan (GTP). Continued efforts to strengthen the implementation, monitoring, and governance of climate change integration can further enhance the resilience and sustainability of Ethiopia's development pathways.

To maximize the benefits of climate change adaptation, mitigation, and adoption systems in Ethiopia such as climate smart, agricultural emissions management and support adaptation efforts, and integrated impact assessments, we need to develop an overarching national climate change and development integration policy, strengthen institutional structures and coordination mechanisms, enhance capacity and resources for policy implementation, and promote transparency, accountability, and stakeholder engagement, strengthening research networks, integrating indigenous knowledge, promoting multidisciplinary approaches, and enhancing funding opportunities.

Improving access to international climate finance mechanisms (e.g., Green Climate Fund, Adaptation Fund) by strengthening national capacity and processes. Expanding domestic resource mobilization through innovative financing instruments, such as green bonds, carbon taxes, and climate-smart public-private partnerships. The implementation of well-designed environmental taxes in Ethiopia can also contribute to addressing the country's pressing environmental challenges.
To address the challenges faced by tenants and small-scale landowners in benefiting from Green Revolution strategies (introduction of high-yielding varieties of crops, improved agricultural practices, and increased use of fertilizers and irrigation), there is the need to enhance access to resources, provide training and support, encourage the formation of cooperatives among smallholder farmers to facilitate collective purchasing of inputs and sharing of knowledge and resources, implement inclusive policies, and monitor and evaluate Impacts.

Understanding the carbon dynamics of forest ecosystems is critical for conservation strategies, climate change mitigation, and promoting its ecological health.

To adopt Green Infrastructure which refers to an interconnected network of green spaces, parks, green roofs, rain gardens, and other natural features integrated into urban planning, we need supporting policy reforms, resource allocation, and innovative solutions.

Inclusive space is a necessary condition for the involvement of indigenous peoples and local communities in multi-stakeholder platforms, but it is not sufficient. Ensuring accountability through transparency, respect for traditional knowledge, and the establishment of robust monitoring mechanisms is crucial for meaningful engagement. Moving forward, stakeholders must commit to genuine partnerships that empower IPLCs, uphold their rights, and acknowledge their vital contributions to sustainable development and environmental conservation.

In rural Ethiopia, the choice of fuel-wood sources is a complex interplay of property rights, local institutions, and socio-economic factors. Strengthening property rights, improving local governance, and considering socio-economic realities can empower communities to manage their resources sustainably, enhancing both fuelwood availability and environmental conservation.

Women experience more severe negative consequences from climate variability compared to men. Policymakers and stakeholders should implement gender-responsive climate adaptation strategies. This includes empowering women through education and resource access, involving them in decision-making processes related to climate resilience, and ensuring that climate policies are inclusive and consider the specific challenges faced by women in the context of climate variability. Collaboration between government, civil society, and research institutions can help develop and implement context-specific, gender-responsive adaptation strategies.

Displaced populations caused by natural and human risks are among the most vulnerable to the impacts

of climate change. Investment in capacity-building and resilience programs for communities at risk of displacement is essential. It is imperative that governments, international organizations, and civil society work together to address the challenges they face, ensuring their rights are protected and their voices are heard. There is a need for legal frameworks to protect the rights of displaced populations, including recognition of their status and access to resources.

Ethiopian NGOs play a vital role in the development of policies concerning natural resource management. However, their participation is often restrained by various factors, including regulatory limitations, lack of funding, limited capacity, and political dynamics which inhibit open dialogue and participation. These challenges must be addressed to enhance their role in promoting sustainable development practices and ensuring that local perspectives are incorporated into policy-making processes.

Integrating global climate change into the geography curricula of Ethiopian secondary and preparatory schools is a necessary step towards building a more informed and proactive generation capable of addressing climate challenges.

Rewarding Incentive Mechanisms for encouraging Green Energy, Green Infrastructure and Organic Farming/Climate Smart Agricultural.

CONCLUSIONS AND WAY FORWARD

Ethiopia faces recurring droughts and varying climate patterns including erratic rainfall patterns, higher temperatures, and increased frequency of extreme weather events that contribute to water scarcity, impacting agricultural productivity and food security. Climate change is posing significant challenges to urban areas too. It has posed a significant negative impact on agricultural productivity, food security, and overall economic development in Ethiopia. The combination of multiple adaptation and mitigation strategies can provide greater benefits. The adoption of climate change mitigation and adaptation strategies is influenced by a complex interplay of knowledge, economic factors, social dynamics, policy support, environmental conditions, and technological availability. Despite advancements in policy formulation and implementation, there are challenges in achieving intended outcomes. These include limited financial resources, inadequate infrastructure, weak institutional capacity and coordination, the need for enhanced stakeholder engagement at local levels, and inadequate monitoring and evaluation of the adaptation benefits. Consequently, climate change impacts continue to pose significant risks. Addressing these barriers yields immense benefits. Some of the tools include integrating policy interventions by (for example, linking land management, water management, and climate management), investments and development planning, and collaborative and integrative efforts into climate change can enhance the adaptive capacity of rural and urban communities.